

Application No.: 10/065,711

Docket No.: JCLA9374

In The Claims:

Claim 1. (currently amended) A photolithography process for Mask ROM coding, comprising:

providing a substrate having an array of memory cells thereon, wherein the memory cells comprising a plurality of buried bit lines in the substrate, a plurality of word lines over the buried bit lines, and a plurality of channels between the buried bit lines;

forming a first photoresist layer on the substrate covering the memory cells;

performing a first exposure and development process to pattern the first photoresist layer into first line/space patterns, wherein the first line/space patterns cover a portion of the channels;

forming a second photoresist layer on the substrate covering the first line/space patterns; and

performing a second exposure and development process to pattern the second photoresist layer into second line/space patterns having an orientation different from an orientation of the first line/space patterns, while a plurality of coding windows are defined by the first line/space patterns and the second line/space patterns.

Claim 2. (original) The photolithography process of claim 1, wherein the first photoresist layer comprises a negative photoresist layer and the second photoresist layer comprises a positive photoresist layer.

Claim 3. (original) The photolithography process of claim 1, wherein the orientation of the first line/space patterns is perpendicular to the orientation of the second line/space patterns.

Claim 4. (original) The photolithography process of claim 1, wherein the first line/space patterns include a plurality of trenches having different lengths.

Claim 5. (original) The photolithography process of claim 1, wherein the second line/space patterns comprise a plurality of linear patterns and linear spaces that are arranged regularly.

Claim 6. (original) The photolithography process of claim 1, wherein the first exposure process and the second exposure process use off-axis illumination.

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Claim 7. (original) The photolithography process of claim 1, wherein the first exposure process and the second exposure process use an exposure light of 248nm.

Claim 8. (original) The photolithography process of claim 1, wherein a coding window defined by the first line/space patterns and the second line/space patterns has a square shape.

Claim 9. (original) The photolithography process of claim 8, wherein the square-shaped coding window has dimensions of $0.12\mu\text{m} \times 0.12\mu\text{m}$.

Claim 10. (currently amended) A photolithography process, comprising:

forming a first photoresist layer on a substrate;

performing a first exposure and development process to pattern the first photoresist layer into first line/space patterns, wherein the first line/space patterns include a plurality of trenches having different lengths;

forming a second photoresist layer on the substrate covering the first line/space patterns; and

performing a second exposure and development process to pattern the second photoresist layer into second line/space patterns having an orientation different from an orientation of the first line/space patterns, while a plurality of rectangle openings are defined by the first line/space patterns and the second line/space patterns.

Claim 11. (original) The photolithography process of claim 10, wherein the first photoresist layer comprises a negative photoresist layer, and the second photoresist layer comprises a positive photoresist layer.

Claim 12. (original) The photolithography process of claim 10, wherein the orientation of the first line/space patterns is perpendicular to an orientation of the second line/space patterns.

Claim 13. (canceled)

Claim 14. (original) The photolithography process of claim 10, wherein the second line/space patterns comprises a plurality of linear patterns and a plurality of linear spaces that are arranged regularly.

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Claim 15. (original) The photolithography process of claim 10, wherein a rectangle opening defined by the first line/space patterns and the second line/space patterns have a square shape.

Claim 16. (original) The photolithography process of claim 10, further comprising performing a photoresist hardening process after the first photoresist layer is patterned into the first line/space patterns.

Claim 17. (original) The photolithography process of claim 16, wherein the photoresist hardening process comprises implanting Ar or N₂ ions with a dosage from about 1×10^{14} to about $3\times10^{15}/\text{cm}^2$ and an implanting energy from about 2KeV to about 50KeV.

Claim 18. (original) The photolithography process of claim 16, wherein the photoresist hardening process comprises a baking step at a temperature from about 100°C to about 150°C for a period from about 30 sec to about 180 sec.

Claim 19. (newly added) The photolithography process of claim 4, wherein the trenches have rounded corners.

Claim 20. (newly added) The photolithography process of claim 10, wherein the trenches have rounded corners.